

# ZeroNAS: Differentiable Generative Adversarial Networks Search for Zero-Shot Learning

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## Abstract

In recent years, remarkable progress in zero-shot learning (ZSL) has been achieved by generative adversarial networks (GAN). To compensate for the lack of training samples in ZSL, a surge of GAN architectures have been developed by human experts through trial-and-error testing. Despite their efficacy, however, there is still no guarantee that these hand-crafted models can consistently achieve good performance across diversified datasets or scenarios. Accordingly, in this paper, we turn to neural architecture search (NAS) and make the first attempt to bring NAS techniques into the ZSL realm. Specifically, we propose a differentiable GAN architecture search method over a specifically designed search space for zero-shot learning, referred to as ZeroNAS. Considering the relevance and balance of the generator and discriminator, ZeroNAS jointly searches their architectures in a min-max player game via adversarial training. Extensive experiments conducted on four widely used benchmark datasets demonstrate that ZeroNAS is capable of discovering desirable architectures that perform favorably against state-of-the-art ZSL and generalized zero-shot learning (GZSL) approaches. Source code is at <https://github.com/caixiay/ZeroNAS>.